

REMARKS

Claims 1-25 were pending in the above-identified application when examined.
Claims 1-22 stand allowed.

Claims 23 and 25 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,355,953 (Kirczenow). Applicants respectfully traverse the rejection.

Claim 23 distinguishes over Kirczenow at least by reciting, "driving the signal current through a wire that is adjacent to the semiconductor region to create a magnetic field that rotates spins of electrons injected through the semiconductor region between the first magnetic region and the second magnetic region." Kirczenow fails to disclose or suggest driving a signal current through a wire adjacent to a semiconductor region.

In regard to the wire recited in claim 23, the Examiner cited gate electrode 61 as illustrated in Fig. 5 of Kirczenow. However, starting at column 9, line 23, Kirczenow states, "FIG. 5 shows a spin-valve transistor 50... Transistor 50 comprises a layer 52 of a semiconductor having two regions 54, 56 of ferromagnetic material deposited on its surface 57... If the ferromagnetic materials of layers 54 and 56 have parallel magnetization then electrons whose spin orientation permits them to pass into semiconductor layer 52 through interface 58 will also be able to pass from semiconductor layer 52 into ferromagnetic layer 56 through interface 60. An electron current can therefore flow through transistor 50. A gate electrode 61 permits the electron current to be controlled."

Kirczenow fails to explain how gate electrode 61 controls the current. However, some spin transistors have been based on the spin-orbital coupling of electrons to a gated electric field. In such devices, the gate voltage changes the chemical potential and the carrier concentration in the channel and produces an electric field in the channel used to precess electron spins by means of the "Rashba" interaction. (See, for example, Fig. 3 of Shankar Das Sarma, "Spintonics," American Scientist, Vol. 89, pp 516-523, a copy of which was submitted to the USPTO with the present patent application, and also see the paragraph starting at column 2, line 27 of Kirczenow.) Like in standard MOSFETs, no current is allowed to flow through the gate electrode. In any case, Kirczenow provides no suggestion of driving a signal current through gate electrode 61 to create a magnetic field that rotates spins of electrons. Accordingly, claim 23 is patentable over Kirczenow.

Claim 25 depends from claim 23 and is patentable over Kirczenow for at least the same reasons that claim 23 is patentable over Kirczenow.

For the above reasons, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 102.

Claim 24 was objected to as dependent upon a rejected claim but were indicated as allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 24 remains dependent from claim 23, which is believed patentable for the reasons given above. Accordingly, Applicants request reconsideration and withdrawal of the objection to claim 24.

Claims 26-29 are added. New claims 26-29 depend from claim 23 and are patentable for at least the same reasons that claim 23 is patentable.

In summary, claims 1-25 were pending in the application. Claims 1-22 were allowed. This response adds claims 26-29. For the above reasons, Applicants respectfully request allowance of the application including claims 1-29.

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Respectfully submitted,



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